

REMARKS

Reconsideration of the application in view of the above amendments and the following remarks is respectfully requested.

Claims 1-26 are pending. Claims 10, 17, 20 and 24 are amended. New claims 27-31 are added. Claims 1-9 and 18 are canceled without prejudice to a future filing of a divisional application. Support for the amendment can be found throughout the specification, and in particular, in Figures 21 and 22. No new matter is introduced by way of this amendment. Upon entry, claims 10-17, 19-31 will be pending.

The Examiner has objected to the specification as failing to provide proper antecedent basis for the subject matter of claim 24. In response, Applicant has amended the specification to include a description of the features of claim 24. Applicant submit that the amendment is fully supported by claim 24 as originally filed and Figure 22.

The Examiner further objects to claim 24 for a number of informalities. Applicant has made appropriate corrections according to the Examiner's suggestion. Applicant therefore requests this ground of objection be withdrawn.

Claim 17 is rejected under 35 U.S.C. §112, second paragraph for containing insufficient antecedent basis for the limitation of "the first direction". Applicant has amended claim 17 to be dependent from claim 16, which refers to "a first direction". Applicant therefore requests this ground of rejection be withdrawn.

Claims 10-12, 14-15 and 19 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,316,784 to Zahorik (hereafter "Zahorik".) Particularly with respect to claim 10, the Examiner is of the opinion that Zahorik discloses in Figure 16 a resistive element 120, a delimiting structure 80 having an aperture over said resistive element, and a memory portion of a phase change material 130, housed in said aperture. The Examiner further alleges that in Zahorik, the resistive element 120 and the memory portion of the phase change material 130 "being in direct electrical contact and defining a contact area of sub lithographic extension".

Claims 10, 20, 24 have been amended to include a feature that the resistive element 22 is cup-shaped and has a substantially vertical wall, said vertical wall having a top surface of sublithographic thickness. Support for this amendment is throughout the specification. For example, this feature is clearly illustrated in Figure 21 and Figure 22 (a top plan view), in which an aperture (57) defined by the delimiting structure (55a) overlies the resistive element to form, at their cross-section, a contact area of sublithographic dimension (58). Thus, the thickness of the vertical wall of the cup-shaped resistive element constitutes one dimension of the contact area.

Claims 10, 20, 24 as amended more clearly point out this feature. In particular, claim 10 is directed to, in part, a contact area defined by a phase change material in contact with a top surface of the vertical wall of the cup-shaped resistive element. Because the thickness of the wall is sublithographic, the contact area is also sublithographic in at least one dimension. Claim 20 as amended to further specifically recites the dimensions of a contact area. Claim 24 as amended is directed to a memory array having at least two memory cells. New independent claim 29 is directed to, in part, a contact area defined by an elongated-shaped portion of a top surface of a resistive element and a slit overlying and transversing the elongated-shaped portion of the resistive element. The contact area therefore has a first dimension substantially the same as the width of the elongated shaped portion of the resistive element, and a second dimension substantially the same as the width of the slit.

Zahorik does not teach or suggest the feature of a cup-shaped resistive element having a substantially vertical wall of sublithographic thickness. Moreover, Zahorik does not teach or suggest a contact area defined by resistive element having a first sublithographic width transversing with a slit (or aperture) having a second sublithographic width. In Zahorik, a lower electrode layer 120, a chalcogenic layer 130 and an upper electrode layer 140 are sequentially deposited to fill an ultra-small pore, *see*, for example, col. 8, lines 29-39 and Figure 7. The lower electrode layer and the chalcogenic layer are therefore of substantially the same planar shape and are in contact with each other by their entire respective surfaces. Applicant therefore submits that claims 10, 20 and 24 as amended and new claim 29 are not anticipated by the disclosure of Zahorik. Similarly, their respective dependent claims are also novel in view of Zahorik.

Claims 10-11, 13, 16-17, 19 and 24-26 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Publication No. 2003/0047762 to Lowrey (hereafter "Lowrey"). In particular, the Examiner is of the opinion that Lowrey discloses a resistive element 14, a delimiting structure 16, 26, and a phase change material 18.

Claims 10, 24 as amended are directed to a memory device comprising a cup-shaped resistive element having a substantially vertical wall of sublithographic thickness. Like Zahorik, Lowrey does not teach or suggest this feature. In addition, Lowrey does not teach or suggest a contact area of sublithographic dimension defined by resistive element having a first sublithographic width transversing with a slit (or aperture) having a second sublithographic width. In Lowrey, the dimension of such a contact area will have to be defined by the dimension of the pore opening 32 (Figure 5) and the thickness of the spacer 30. Lowrey, however, makes no reference to the dimension of the pore opening 32. Accordingly, claims 10, 24 and new claim 29 are novel, as are their respective dependent claims, in view of the disclosure of Lowrey. Applicant respectfully requests this ground of rejection be withdrawn.

Claims 20-23 are rejected under 35 U.S.C. §103(a) as being unpatentable over Zahorik in view of acknowledged prior art in the instant application. The Examiner is of the opinion that Zahorik discloses substantially all the elements of claim 20 except a selection element. In view of the teaching of associating a selection element with a phase change memory, the Examiner therefore concludes that claims 20-23 are obvious.

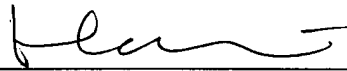
As noted above, claim 20 has been amended to include a feature of a cup-shaped resistive element having a substantially vertical wall of sublithographic thickness. As previously discussed, this claim element is not taught or suggested in Zahorik. Accordingly, claim 20 is novel and non-obvious over Zahorik independent of the additional recitation of a selection element. Applicant therefore respectfully submits that claim 20 and its dependent claims are patentable over Zahorik in view of the disclosure of the instant application.

Application No. 10/824,631
Reply to Office Action dated August 25, 2005

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,
SEED Intellectual Property Law Group PLLC



Hai Han, Ph.D.
Registration No. 54,150

HXH:lcs

Enclosure:
Postcard

701 Fifth Avenue, Suite 6300
Seattle, Washington 98104-7092
Phone: (206) 622-4900
Fax: (206) 682-6031

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